Claims

1.   A computer aided method of modelling a three-dimensional object, the method comprising the steps of:

        providing data defining a frame representing a three-dimensional space
5   for the object, wherein the frame has associated dimension data;

        displaying an image representing the frame;

        selecting a component from a library of components;

        selecting a location in the frame to apply the selected component; and

        applying the selected component to the frame,

10   wherein the applying step comprises:

        accessing the dimension data of the frame;

        scaling the dimensions of the component to the frame; and

        displaying the scaled component in the frame,

wherein the scaled component represents at least part of the object being
15   modelled.

2.   A method according to claim 1, wherein the frame comprises constraint data, and the component comprises compliance data, wherein the applying step comprises testing the compliance data to determine whether it conforms to the
20   constraint data and thereby controlling the step of applying the component to the frame. ·

3.   A method according to claim 2, wherein the constraint data comprises specification data specifying the allowed components for the said frame, and the
25   controlling step comprises enabling display if the compliance data of the selected component indicates that the selected component is allowed for the said frame.

4.   A method according to claim 2 or 3, wherein the constraint data comprises specification data specifying at least one allowed orientation of at least
30   one component for the said frame, wherein the applying step comprises disposing the component in a chosen orientation and the controlling step comprises enabling display if the compliance data of the selected component indicates that the selected component is allowed to be in the chosen orientation for the said frame.

5.   A method according to claim 2, 3 or 4 wherein the constraint data comprises specification data specifying at least one allowed disposition of at least one component for the said frame, wherein the applying step comprises

5   disposing the component in a chosen disposition and the controlling step comprises enabling application of the component if the compliance data of the selected component indicates that the selected component is allowed to be in the chosen disposition for the said frame.

10   6.   A method according to any preceding claim comprising
        selecting at least one further component from the library;
        selecting a location in the frame to apply the selected component
        applying the selected further component to the frame, wherein the
applying step comprises accessing the dimension data of the frame;

15   scaling the dimensions of the further component to the frame; and
        displaying the adapted further component in the frame.

7.   A method according to any preceding claim further comprising modifying at least one of the size, orientation or disposition of the frame, whereby the or

20   each displayed component varies correspondingly.

8.   A method of deriving manufacturing data for a three-dimensional object comprising the method of any preceding claim, and further comprising outputting data derived from said adapted frame and its selected components, as said

25   manufacturing data.

9.   A system constructed and arranged for modelling a three-dimensional object, the system comprising a component store for storing a library of components and a user input device operable to define a frame representing a

30   three-dimensional space for the object, to select a component from the library of components and to apply the selected component to the frame;
        a display screen for displaying the frame and displaying the selected component; and
        a processor for running a stored program operable to derive dimension

35   data for the frame, to access the dimension data of the frame, to scale dimension

data representing the component to the dimension data of the frame and to provide the scaled data to the display screen whereby the display screen displays the scaled component in the frame as at least part of the object.

5　10.　A system according to claim 9, further comprising a frame store for plural frame types, each said type having associated data representing constraints, wherein the user input device is operable to select a frame type from said plural frame types, and each component of said library of components has associated data representing compliance information, wherein the stored program is

10　operable to test the compliance data of a selected component to determine whether it conforms to the constraint data of the selected frame type and thereby control the adaptation of said data representing the component to affect the display of the adapted component in the frame.

15　11.　A system according to claim 10, wherein the constraint data comprises specification data specifying at least one of the group comprising:

allowed components for the said frame,

an allowed orientation of at least one component for the said frame type; and

20　an allowed disposition of at least one component for the said frame type.

12.　A system according to claim 11, wherein the stored program is operable to adapt the component data if the compliance data of the selected component indicates that the selected component is allowed for said frame type.

25

13.　A system according to claim 11 or 12, wherein the user input device is arranged to allow a user to choose an orientation for the selected component, and the stored program is operable to adapt the component data to represent the chosen orientation to thereby enable display, if the compliance data of the

30　selected component indicates that the selected component is allowed to be in the chosen orientation for the said frame type.

14.　A system according to claim 11, 12 or 13, wherein the user input device is arranged to allow a user to choose a disposition for the selected component, and

35　the stored program is operable to adapt the component data of the selected

component to represent the chosen disposition of the component to thereby enable display if the compliance data of the selected component indicates that the selected component is allowed to be in the chosen disposition for the said frame type.

5

15.   A system according to any one of claims 9 – 14, wherein the user input device is operable to allow a user to modify at least one of the size, orientation and disposition of the frame, and the stored program is operable to correspondingly adapt the component data for the or each component displayed
10   in the frame whereby the object displayed varies.

16.   A method according to any of claims 1 – 8, or a system according to any of claims 9 – 15, specially adapted for modelling roofs.

15   17.   A method according to any of claims 1 – 8 or a system according to any of claims 9 – 15, specially adapted for modelling vehicle interiors.

18.   A method according to any of claims 1 – 8 or a system according to any of claims 9 – 15, specially adapted for modelling aircraft interiors.
20

19.   A method according to any of claims 1 – 8 or a system according to any of claims 9 – 15, specially adapted for retail interiors such as shelves and racking.

20. .   A method according to any of claims 1 – 8 or a system according to any of
25   claims 9 – 15, specially adapted for furniture.

21.   A method according to any of claims 1 – 8 or a system according to any of claims 9 – 15, specially adapted for lighting and/or electrical installation.

30   22.   A method according to any of claims 1 – 8 or a system according to any of claims 9 – 15, specially adapted for buildings.

23.   A method according to any of claims 1 – 8 or a system according to any of claims 9 – 15, specially adapted for gardens or parks.

35

24.   A computer program which when loaded on a general purpose computer causes it to perform the method of claim 1 or any of its dependent claims.

25.   A computer aided method of modelling a three-dimensional object, the
5   method comprising the steps of providing a library of components;

selecting a component from the library;

applying the selected component to the frame;

wherein the applying step comprises:

accessing compliance data associated with the component;

10   . accessing constraint data associated with an object on which the component is to be positioned; and,

testing the compliance data to determine whether it conforms to the constraint data and thereby determining whether or not to apply the selected component to the object.

15

26.   A computer generated method of modelling a three-dimensional object, the method comprising the steps of :

providing data defining a frame representing a three-dimensional space for the object, wherein the frame has associated dimension data;

20   displaying an image representing a frame;

selecting a component from a library of components;

selecting a location in the frame to apply the selected component; and

applying the selected component to the frame,

wherein the applying step comprises:

25   accessing constraint data associated with the frame;

accessing compliance data associated with the object; and

testing the compliance data to determine whether its conforms to the constraint data; and

thereby determining whether or not to apply the component to the frame.

30

27.   A computer generated method for modelling a three-dimensional object according to claim 16 wherein the constraint data is associated with edges of the component and each component may have different constraint data associated with different respective edges.

35

28.   A method for retrieving construction data for a three-dimensional object
being modelled in a computer aided modelling system comprising the steps of;
        storing construction data for at least one part of the object;
        storing a graphical image representing the object for display on a
5   graphical display;
        linking relevant construction data to the corresponding parts of the
graphical image;
        indicating on the graphical display that construction data is available
about parts of the object on the image;
10   selecting a part of the image from which to retrieve construction data;
        retrieving construction data for the selected part of the image; and
        displaying the retrieved construction data on the graphical display.

29.   A method for retrieving construction data for a three-dimensional object
15   being modelled in a computer aided modelling system according to claim 28
comprising the further steps of selecting parts of the image on the graphical
display and magnifying the selected parts of the image on the graphical display.

30.   A method for retrieving construction data for a three-dimensional object
20   being modelled in a computer aided modelling system according to claim 29
wherein the step of indicating that construction data is available is performed
when the relevant part is magnified.

31.   A method for retrieving construction data for a three-dimensional object
25   being modelled in a computer aided modelling system according to claim 28, 29
or 30 wherein the step of indicating that construction data is available is
performed by a displaying icon on the image.

32.   A method for retrieving construction data for a three-dimensional object
30   being modelled in a computer aided modelling system according to claim 28, 29,
30 or 31 wherein the step of indicating that construction data is available includes
the step of displaying the types of data available about the part.

33.   A method for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to any of claims 28 to 32 wherein the data are a list of components.

5   34.   A method for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to any of claims 28 to 33 wherein the data are the dimensions of the part of the object.

35.   A method for retrieving construction data for a three-dimensional object
10 being modelled in a computer aided modelling system according to any of claims 28 to 34 wherein the data are text describing the part.

36.   A method for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to any of claims
15 28 to 35 wherein the data is a video stream describing method for construction of the part.

37.   A method for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to any of claims
20 28 to 36 wherein the part is a joint.

38.   An apparatus for retrieving construction data for a three-dimensional object being modelled on a computer aided modelling system comprising;
        means for storing construction data for at least one part of the object;
25   means for storing a graphical image representing the object for display on the graphical display;
        means for linking relevant construction data to the graphical image;
        means for indicating on the graphical display that construction data is available about parts of the object on the image;
30   means for selecting a part of the image from which to retrieve construction data;
        means for retrieving construction data for the selected part of the image; and
        means for displaying the retrieved construction data on the graphical
35 display.

39.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to claim 38 further comprising a means for selecting parts of the image on the graphical
5   display and means for magnifying parts of the image on the graphical display.

40.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to claim 39 wherein the means for indicating that construction data is available is
10   activated when the relevant part is magnified.

41.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to claim 38, 39 or 40 wherein the means for indicating that construction data is available is
15   an icon on the image.

42.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to claim 38, 39, 40 or 41 wherein the means for indicating that construction data is
20   available displays the types of data available about the part.

43.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to any of claims 38 to 42 wherein the data are a list of components.
25

44.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to any of claims 38 to 43 wherein the data are the dimensions of the area of the object.

30   45.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system according to any of claims 38 to 44 wherein the data is text describing the part.

46.   An apparatus for retrieving construction data for a three-dimensional
35   object being modelled in a computer aided modelling system according to any of

claims 38 to 45 wherein the data is a video stream describing method for construction of the part.

47.   An apparatus for retrieving construction data for a three-dimensional
5   object being modelled in a computer aided modelling system according to any of claims 38 to 46 wherein the part is a joint.

48.   A method for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system substantially as herein
10   described with reference to the accompanying figures.

49.   An apparatus for retrieving construction data for a three-dimensional object being modelled in a computer aided modelling system substantially as herein described with reference to the accompanying figures.